

NORTHEAST STATES WMA QUALIFICATION PROCESS

I. WMA TECHNOLOGY QUALIFICATIONS/EXPERIENCE

1. WMA Technology Specific Information

Please provide technology specific information about your WMA technology. The information provided should be sufficient to provide the Sponsor State DOT with a basic understanding as to how the WMA technology works.

2. Experience with WMA

Please list your firm's experience using the WMA technology in other states, including the following:

- Location(s)
- Quantity of WMA Placed
- Traffic volume ESALs preferred (AADT with % trucks acceptable)
- Additional Relevant Information

3. Contact Information

Please provide contact information of individuals or agencies capable of providing relevant information regarding your WMA technologies performance.

- State DOT Representatives
- FHWA State Office Representatives
- Municipal Agencies
- Other

4. WMA Results & Test Data

Please submit all pertinent test results and data on WMA placed in other states. Please include all information on the PG Binders used and related PG Binder test data.

II. SUBMIT BINDER & ADDITIVE SAMPLES FOR SPONSOR STATE DOT TESTING

1. Submit Binder & Additive Samples

- The technology supplier will submit binder, additives in quantities necessary to perform the desired DOT testing.

2. Required Testing

- The Sponsor State DOT will determine (actual) PG Binder grade of the binder with and without the WMA additive, if practical, according to AASHTO R29 (Section 6)/M320.
- The Sponsor State DOT will also test a RTFO sample aged at 135°C, to determine the effect of a lower plant aging temperature on the PG Binder.

2. Additional Testing

The Sponsor State DOT may conduct the following testing for informational purposes:

- a. MSCR/JNR determination according to AASHTO TP70
- b. Recover binder from plant samples for PG grade determination; especially when binder samples after adding the WMA technology are not easily obtained, such as foaming technologies.

III. REQUIRED MIXTURE TESTING ON SPONSOR STATE DOT MIX DESIGNS

WMA technology supplier will provide test results for both the WMA and the corresponding Sponsor State DOT production (approved) HMA mix design meeting the following requirements:

- 75 or 80 gyration mix design, depending on the Sponsor State's requirements
- A neat PG Binder grade, typically used in the Sponsor State
- 9.5 or 12.5 Top Course (the Sponsor State may specify depending on predominant mix type in an area)
- HMA without RAP

- WMA without RAP produced at or below 275°F.
- WMA technology added at a typical rate

Note: Additional mixes may be required if different addition rates are used for different applications, if anti-strip agent is required for some aggregates, etc.

Note: Test Specimens must be made from plant produced WMA if adding the WMA Technology in the laboratory does not simulate the production process.

The following test results must be submitted for both the HMA and WMA mixtures:

- Gradation
- Asphalt Content
- Volumetric Properties per the Sponsor State DOT's appropriate mixture design procedures (list any special WMA sample conditioning/preparation and non-standard test temperatures)
- Moisture Susceptibility – AASHTO T283
- Mixture Rut Testing – Test results from at least one of the following:
 - Hamburg Wheel-Track Testing of Compacted Hot Mix Asphalt (HMA) AASHTO T324
 - Determining Rutting Susceptibility of Hot Mix Asphalt (HMA) Using the Asphalt Pavement Analyzer (APA) T340
 - Determining the Dynamic Modulus and Flow Number for Hot Mix Asphalt (HMA) Using the Asphalt Mixture Performance Tester (AMPT) TP79

Note: May use current HMA QC/QA data for HMA volumetric properties, gradation and asphalt content test requirements.

Note: Age both the HMA and WMA at their respective compaction temperature for 2 hours for plant produced mix and 4 hours for lab produced mix.

IV. SUBMIT TECHNOLOGY SPECIFIC *PRODUCTION, TESTING AND COMPACTION DETAILS*

Provide specific details for the WMA technology. This document should be a set of directions from the technology supplier to any of the possible users of that technology to ensure proper handling and use. In addition to the general product and company contact information, include information such as:

- Plant infrastructure and equipment requirements
- Storage and handling
- Addition rates and mix design
- Production temperatures, QC/QA testing and silo storage

- Laydown, compaction and handwork issues

See Appendix A for more detailed information.

Some States may require these details be followed during production and construction, in addition to being used by Contractors/Producers in determining which technology best meets their needs. Some States' online Qualified Products/Approved List may also link to this document. If there is a concern with publishing certain information, please notify the Sponsor State to develop an acceptable solution.

V. APPROVAL

At a minimum the following criteria will be evaluated in determining the acceptance of the WMA technology:

Acceptable Information from Other States

- Minimum of 1 year experience in 1 state or Canada
- Placed on mainline pavement with >3 million ESALs
- Positive feedback from State and FHWA contacts
- Comparable WMA to HMA laboratory and pavement performance results

No Negative Impact to Binder Performance Grade

- Acceptable Sponsor State DOT binder test results showing the WMA technology does not negatively impact the PG Binder grade
- Acceptable test results on Sponsor State DOT specific WMA Mix Design

Comparable Mix Properties

- Comparable and in-spec volumetric properties, gradation, asphalt content, etc. according to the Sponsor State DOT's appropriate mixture design procedure.
- AASHTO T 283 moisture susceptibility test results >80% TSR
- Mixture Rut Test results.

APPENDIX A

PRODUCTION, TESTING AND COMPACTION DETAILS

Basically, this document should be a set of directions from the technology supplier to any of the possible users of that technology to ensure its proper use.

Some States may require these details be followed during production and construction, in addition to being used by Contractors/Producers in determining which technology best meets their needs. Some States' online Qualified Products/Approved List may also link to this document. If there is a concern with publishing certain information, please notify the Sponsor State to develop an acceptable solution.

In addition to the general product and company information, the following should be considered the type of information that needs to be conveyed to all the parties involved, but may not be all inclusive of the information needed.

While it is expected that all the parties will follow the directions that are laid out in this document, it is also understood that not all situations can be foreseen. This document can be easily amended by the Technology supplier throughout the year to accommodate these situations on a global basis. If the situation is more plant or project specific, amendments can also be made on a plant/project specific basis. Additionally, some modification may be necessary for individual States, based on their requirements.

Any questions regarding developing these details should be directed to the Sponsor State's representative.

At the PG Binder Primary Source for Chemical and Organic Additives (If Applicable)

- Equipment Needs – What equipment is needed to properly mix the additive with the PG Binder?
 - Pumps – capable of pumping a minimum of XX.XX gpm
 - In-Line Mixers – Static, High Shear, etc
 - Meters to control the dosage rate – “capable of measuring a flow rate of XX.XX”
- Dosage Rate(s) – What is the proper dosage rate?
 - If varying dosage rates are used, what are the criteria for using various rates?
- Storage/handling Requirements
 - Are there any special handling precautions for the additive?
 - What is the shelf life of the additive itself?
 - Are there any special environmental conditions that the additive itself needs to be stored at? Cool, dry etc.?
 - How long can the PG Binder be stored after mixing with the additive?
 - At what temperature should the PG Binder with the additive be stored?
 - Is any mixer or recirculation needed?
- Shipping Requirements

- Are there any special shipping requirements/needs?

At the HMA Producers Facility

- **Chemical or Organic Additives that are Pre-Blended into the PG Binder (If applicable)**
 - Are there any special storage/handling requirements for the pre-blended material?
 - Allowable storage time?
 - Mixing or recirculation needs?
 - Is there any dosage rate information that the HMA plant should be aware of when ordering pre-blended PG Binder?
 - Varying dosage rates for various RAP Contents?
 - Varying dosage rates for other variations?
 - What should the HMA plant do if situations change? For example, the plant plans on running a mix with 20% RAP. They order a pre-blended PG Binder containing the proper dosage for that amount of RAP. The RAP belt breaks down during production, what should the HMA Producer do? Should they stop producing the WMA mix? Does the dosage rate have a detrimental effect a non-RAP mix?
 - What is the recommended mixing temperature(s)?
 - Is this a set temperature or a drop of XX degrees from the HMA mixture?
- **Chemical, Organic, or Zeolites that are blended into the PG Binder or the mixture at the HMA plant (If applicable)**
 - Are there any special storage/handling requirements for the additive itself?
 - What is the shelf life of the additive itself?
 - Are there any special environmental conditions that the additive itself needs to be stored at? Cool, dry etc.?
 - What is required to get the additive into the PG Binder or the mixture?
 - Can this be done on Drum and Batch plants? And what are the differences in the equipment needed?
 - What equipment is needed?
 - Pumps – capable of pumping a minimum of XX.XX gpm
 - In-Line Mixers – Static, High Shear, etc
 - Meters to control the dosage rate – “capable of measuring a flow rate of XXX”
 - What connections need to be made?
 - What is used to meter the amount of additive?

- Plant automation
 - For Drum plants, does the plant need to be run at a constant speed when using this technology? Or is the additive equipment variable, linked to, and calibrated to the plant speed?
 - Recordation of the dosage rate is required. How does this need to be accomplished?
- What is the dosage rate?
 - Can this rate vary with the type of mix being used? Mix with 20% RAP versus a mix with no RAP?
 - Are there other reasons to vary the dosage rate?
- What is the recommended mixing temperature(s)?
 - Is this a set temperature or a drop of XX degrees from the HMA mixture?
- **Foaming Processes (If applicable)**
 - Equipment requirements
 - Does this system work with drum plants? Batch plants? Both?
 - Is this a retrofit system? Or does it come with new plants, drums, etc?
 - Is your system compatible with plants manufactured by others?
 - What does your system come with?
 - What equipment is the HMA Producer responsible for having or purchasing?
 - What are the electrical requirements of the plant?
 - How is the system connected to the plant?
 - How is the water attached to the system? Is the water required to be used from a holding tank, or can the system be directly connected to a municipal water supply?
 - Plant Automation
 - How is the water dosage controlled? This dosage also needs to be calibrated and recorded according to State's specifications, how will this be accomplished?
 - What is the dosage rate?
 - Can this rate vary with the type of mix being used? Mix with 20% RAP versus a mix with no RAP?
 - Are there other reasons to vary the dosage rate?
 - What is the recommended mixing temperature(s)?
 - Is this a set temperature or a drop of XX degrees from the HMA mixture?
 - Equipment maintenance issues?

Mixture Design and Quality Control/Quality Assurance Testing Requirements

- Are there special handling requirements?
- Does the sample need to be aged or conditioned before performing volumetric mix testing? (For example some technologies require the mixture be placed in an oven for 2 hours before testing.)
 - o If needed, what are some of the details
 - Aged/Conditioned at what temperature?
 - Aged or Condition for what time period?
 - Does the mix need to be turned or remixed every half hour while aging/conditioning, etc?
- At what temperature should the gyratory specimens be made?
- Other?

Information for the Contractors (Laydown Crews)

- Are there special handling requirements?
- At what temperature(s) should the mixtures be arriving?
- When compared to conventional mixtures, can the contractor expect to laydown the same loose thicknesses to achieve a specified compacted thickness? (For example, the contractor places the mixture 2 ½ inches thick, expecting to have a 2 inch thick mat after final compaction.)
- At what temperature should compaction of the mixture take place?
 - o Is there a temperature at which the mix returns to acting like a conventional mix?
- At what temperature is it safe to return traffic to the road?
- If multiple lifts of material are being placed, what temperature should the first lift be at before placing the second lift?
- Are there any concerns with handwork?